

Claims:

1. A biomedical electrode comprising:
a conductive polymeric sheet comprising an upper side and a lower side;
5 a conductive undercoating attached to the lower side of the conductive polymeric sheet;
an electrolyte layer attached to the conductive undercoating, wherein the conductive undercoating is located between the electrolyte layer and the lower side of the conductive polymeric sheet;
10 a current spreading layer attached to the upper side of the conductive polymeric sheet, wherein the current spreading layer comprises a metallic layer on the upper side of the conductive polymeric sheet; and
an electrical connector attached to the biomedical electrode, the electrical connector in electrical communication with the conductive polymeric sheet through the
15 current spreading layer.
2. A biomedical electrode according to claim 1, wherein the metallic layer exhibits a bulk conductivity that is greater than a bulk conductivity of the conductive polymeric sheet.
- 20 3. A biomedical electrode according to claim 1, wherein the biomedical electrode is free of adhesive between the metallic layer and the conductive polymeric sheet.
4. A biomedical electrode according to claim 1, wherein the metallic layer consists
25 essentially of one or more metals.
5. A biomedical electrode according to claim 1, wherein the metallic layer comprises an electrically conductive ink.
- 30 6. A biomedical electrode according to claim 1, wherein the current spreading layer is coextensive with the upper side of the conductive polymeric sheet.

7. A biomedical electrode according to claim 1, wherein the current spreading layer comprises a pattern that comprises one or more voids, wherein a portion of the upper side of the conductive polymeric sheet is free of the metallic layer within the one or more voids.
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8. A biomedical electrode according to claim 1, wherein the current spreading layer comprises a moisture barrier between the electrical connector and the electrolyte layer.
9. A biomedical electrode according to claim 1, wherein the conductive undercoating
- 10 comprises a substantially non-polarizable interface with the electrolyte layer.
10. A biomedical electrode according to claim 1, wherein the conductive polymeric sheet comprises electrically conductive particles dispersed in a polymeric matrix.
- 15 11. A biomedical electrode according to claim 1, wherein the electrolyte layer comprises ionically conductive hydrogel pressure sensitive adhesive.
12. A biomedical electrode according to claim 1, further comprising an electrically conductive adhesive tape, wherein the electrically conductive adhesive tape attaches the
- 20 electrical connector to the current spreading layer.
13. A biomedical electrode according to claim 12, wherein at least a portion of the electrically conductive adhesive tape is located between the electrical connector and the current spreading layer.
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14. A biomedical electrode comprising:
- a conductive polymeric sheet comprising an upper side and a lower side;
- a conductive undercoating attached to the lower side of the conductive polymeric sheet;
- 30 an electrolyte layer attached to the conductive undercoating, wherein the conductive undercoating is located between the electrolyte layer and the lower side of the conductive polymeric sheet;

a current spreading layer attached to the upper side of the conductive polymeric sheet, wherein the current spreading layer comprises a pattern that comprises one or more voids, wherein a portion of the upper side of the conductive polymeric sheet is free of the current spreading layer within the one or more voids; and

5 an electrical connector attached to the biomedical electrode, the electrical connector in electrical communication with the conductive polymeric sheet through the current spreading layer.

10 15. A biomedical electrode according to claim 14, wherein the biomedical electrode is free of adhesive between the current spreading layer and the conductive polymeric sheet.

16. A biomedical electrode according to claim 14, wherein the current spreading layer exhibits a bulk conductivity that is greater than a bulk conductivity of the conductive polymeric sheet.

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17. A biomedical electrode according to claim 14, wherein the current spreading layer is coextensive with the upper side of the conductive polymeric sheet.

20 18. A biomedical electrode according to claim 14, wherein the current spreading layer consists essentially of one or more metals.

19. A biomedical electrode according to claim 14, wherein the current spreading layer comprises an electrically conductive ink.

25 20. A biomedical electrode according to claim 14, wherein the conductive undercoating comprises a substantially non-polarizable interface with the electrolyte layer.

21. A biomedical electrode according to claim 14, wherein the conductive polymeric sheet comprises electrically conductive particles dispersed in a polymeric matrix.

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22. A biomedical electrode according to claim 14, wherein the electrolyte layer comprises ionically conductive hydrogel pressure sensitive adhesive.

23. A method of manufacturing a biomedical electrode, the method comprising:
providing a conductive polymeric sheet comprising an upper side and a lower side;
attaching a conductive undercoating to a lower side of a conductive polymeric
5 sheet;
attaching an electrolyte layer to the conductive undercoating, wherein the
conductive undercoating is located between the electrolyte layer and the lower side of the
conductive polymeric sheet;
providing a current spreading layer on the upper side of the conductive polymeric
10 sheet, wherein the current spreading layer comprises a metallic layer on the upper side of
the conductive polymeric sheet; and
attaching an electrical connector to the biomedical electrode, the electrical
connector in electrical communication with the conductive polymeric sheet through the
current spreading layer.
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24. A method according to claim 23, wherein the metallic layer exhibits a bulk
conductivity that is greater than a bulk conductivity of the conductive polymeric sheet.
25. A method according to claim 23, wherein the biomedical electrode is free of
20 adhesive between the metallic layer and the conductive polymeric sheet.
26. A method according to claim 23, wherein the metallic layer consists essentially of
one or more metals.
- 25 27. A method according to claim 23, wherein the metallic layer comprises an
electrically conductive ink.
28. A method according to claim 23, wherein the current spreading layer is
coextensive with the upper side of the conductive polymeric sheet.
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29. A method according to claim 23, wherein the current spreading layer comprises a pattern that comprises one or more voids, wherein a portion of the upper side of the conductive polymeric sheet is free of the metallic layer within the one or more voids.
- 5 30. A method of manufacturing a biomedical electrode, the method comprising:
providing a conductive polymeric sheet comprising an upper side and a lower side;
attaching a conductive undercoating to a lower side of a conductive polymeric sheet;
attaching an electrolyte layer to the conductive undercoating, wherein the
10 conductive undercoating is located between the electrolyte layer and the lower side of the conductive polymeric sheet;
providing a current spreading layer on an upper side of the conductive polymeric sheet, wherein the current spreading layer comprises a pattern that comprises one or more voids, wherein a portion of the upper side of the conductive polymeric sheet is free of the
15 current spreading layer within the one or more voids; and
attaching an electrical connector to the biomedical electrode, the electrical connector in electrical communication with the conductive polymeric sheet through the current spreading layer.
- 20 31. A method according to claim 30, wherein the current spreading layer exhibits a bulk conductivity that is greater than a bulk conductivity of the conductive polymeric sheet.
32. A method according to claim 30, wherein the biomedical electrode is free of
25 adhesive between the current spreading layer and the conductive polymeric sheet.
33. A method according to claim 30, wherein the current spreading layer consists essentially of one or more metals.
- 30 34. A method according to claim 30, wherein the current spreading layer comprises an electrically conductive ink.

35. A method according to claim 30, wherein the current spreading layer is coextensive with the upper side of the conductive polymeric sheet.